

**"எண்ணிய முடிதல் வேண்டும்... இனிய
செயல்தான் மேல்!"**

- MAHAKAVI

**"IT'S NOT ENOUGH TO MERELY THINK—ACTION
WITH DETERMINATION IS SUPREME!"**

மகாகவி

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Beyond the screen: My NIC Journey

T H A N K S

As I reflect on my journey of 31 years+ in NIC, I am filled with immense gratitude for the unwavering support, encouragement, and opportunities that have shaped both my professional and personal growth.

I extend my heartfelt thanks to the organization that has been the foundation of this long and fulfilling career. My sincere appreciation goes to all the Director Generals (DGs), Heads of Groups (HoGs), and Heads of Divisions (HoDs) whose consistent support and guidance have been instrumental in the success of numerous projects and initiatives.

I am especially thankful to the Training Division for providing me with the opportunity to participate in Management Development Programs (MDPs), Technical Development Programs (TDPs), specialized training modules, and the Vidyakosh online programs—all of which enriched my knowledge and professional capabilities.

To all the State Informatics Officers (SIOs) who guided me, encouraged my efforts, and constructively corrected me whenever needed—your support has been invaluable. I am equally grateful to my fellow colleagues, from 1994 to the present day, with whom I've had the privilege to work, learn, face challenges, celebrate successes, and grow alongside.

I also wish to acknowledge the collaboration extended by various Central and State Government departments, including their Heads of Departments, officers, and staff. It has been an honor to work with you, learn from you, and contribute meaningfully with the backing of my organization.

My special thanks to all Chief Secretaries, Secretaries to the Government, and Heads of Departments for embracing the technical solutions we provided and for their administrative support in implementing various e-governance projects.

I extend my deep appreciation to the FMEs, NFOs, and VC support engineers for their hard work, dedication, and timely assistance in managing the operational and maintenance aspects of our infrastructure.

A heartfelt thank you goes out to all the NICSI programmers who have been associated with me over the past two decades. Together, we not only learned but also forged a formidable team that delivered impactful software solutions across multiple projects.

Last but certainly not least, I express my profound gratitude to my family. Without their unconditional love, support, and care, I would not have been able to perform my duties with dedication or maintain the well-being needed to meet the organization's expectations.

This book is a humble tribute to all those who have been part of this remarkable journey. Thank you for walking with me.

Beyond the screen: My NIC Journey

1. Part 1: The Journey Begins
2. Part 2: Managing IT in Government
 - Early roles in IT and Governance
 - Expanding responsibilities as System Analyst
 - Driving Digital Transformation in Election Management
 - The CIPA initiative
 - Leading Large scale e-Governance Projects
 - Navigating the complexities of Smart card implementation
 - Setting up a seamless Data exchange mechanism
 - Overcoming challenges and establishing a scalable model
 - A model for other states to replicate
 - Modernizing the Employment exchange system – A landmark transformation
 - Publishing papers , webinars and Copy Rights
3. Part 3: My tenure as SIO
 - At the helm of E-Governance: Leadership as SIO
 - Strengthening Administrative and Operational Efficiency
 - Representing NIC at High Level Decision Making forums
 - Fostering a Positive work environment and Financial discipline
 - Stepping into the Role of State Informatics Officer(SIO)
 - A legacy in e-Governance and IT transformation
 - Seamless Migration to national cloud
 - Strengthening Cyber security and Data protection
 - Institutionalizing Governance, Accountability and Project excellence
 - Representing Puducherry at National Platform
 - Fostering a Culture of learning and professional growth
 - The Impact of Policies on IT operations
 - Major responsibilities given by Apex Administration
 - National level recognition
4. Part 4: Learnings
 - Forming Teams
 - Evolution of Policies and SoPs
 - Hiring manpower
 - Financial approval for project extension
 - Approval for Data formats and standardization
5. Part 5: Conclusion: Reflections on 31 years in Government IT

Beyond the screen: My NIC Journey

Part 1: The Journey Begins

The journey into NIC was set in motion with the All India CAPES test held in 1993—a modern, computer-aided, paperless examination system—where I took my test in NIC Chennai, unaware that this moment would carve the path for a career in Government sector. Two months later, on a pleasantly tranquil day, an official letter arrived, requesting me to attend an interview at Delhi. With excitement and anticipation, I embarked on my first-ever train journey to Delhi, a city that symbolized new beginnings. Nestled in the serene ambiance of the Puducherry Guest House, on a rainy day, I prepared for what lay ahead. The interview at NIC was both rigorous and defining, spanning two panels, with the second panel graced by Shri Dr.Vijayaditya, who later led NIC as its esteemed Director General. Then, in February 1994, a moment of pure elation unfolded—a letter of appointment, an invitation to be part of future governance through technology. My destination was the Gujarat State Unit, where I would step into a world where innovation met administration, setting the stage for a career that would be as transformative as it was fulfilling.

March of 1994 marked the dawn of a new chapter as I stepped into the world of NIC, my journey beginning in the vibrant state of Gujarat. Though I had heard whispers of NIC's pioneering work, witnessing its synergy with the government in transforming governance through technology was nothing short of awe-inspiring. The hum of servers, the glow of terminals, the twinkling VSAT controllers inside the glass partitions, and the quiet determination of minds at work painted a picture of progress in motion.

The early days of my journey at NIC unfolded in **Gandhinagar**, where I underwent my initial training at the **Gujarat State Unit (GSU)** under the insightful guidance of **Dr. Subir Roy**, the esteemed **State Informatics Officer**, alongside the unwavering mentorship of **Mr. Rajnish Mahajan, Mr. D.K. Jhala, and Mr. Shailesh**. Their expertise and leadership provided me with a strong foundation in the realm of e-Governance. Amidst this professional initiation, I found friendship in **Mr. Krishnamurthy, currently working in TNSU** and **Mr. Murugan**, whose kindness and support eased my transition, helping me navigate both my workplace and the challenge of finding a home in a new city. Along the way, I also met **Mr. Chandrasekaran** and **Mr. Madhusudhana Rao, Sh.Abraham Verghese** were my batchmates, who would later ascend to the roles of **Assistant State Informatics Officers (ASIOs) in Andhra Pradesh**. Together, we embraced the joys and struggles of our early careers, sharing a modest residence in a private society, where we quickly mastered the art of

Beyond the screen: My NIC Journey

self-sufficiency—learning to cook, managing household chores, and forging a bond that transcended professional ties. The three months we spent together were nothing short of unforgettable, filled with laughter, late-night discussions, and the shared excitement of shaping the future through technology. Then came the inevitable moment of parting, as we received our initial postings to different districts, marking the beginning of a new chapter. My path led me to **Panchmahals district**, where I assumed the role of **District Informatics Officer**, ready to take on the challenge of bringing digital transformation to the heart of governance at the grassroots level.

Stepping into my role as District Informatics Officer in Panchmahals, I found myself at the heart of governance, engaging regularly with the Collector, Mamlatdars, Treasuries, Civil Supplies, Revenue, and Planning departments. Many of these offices had already begun their digital transition, utilizing dumb terminals connected to a XENIX server, while a VSAT network with a C-200 controller facilitated seamless data transfer and communication across districts as well as state unit. Eager to make an impact, I swiftly familiarized myself with routine operations, proactively introducing new departments to the benefits of computerization and conducting training programs with Gujarati assistance to ensure accessibility. Encouraged by the Collector, I took the challenge of learning Gujarati and Hindi, which not only enriched my communication but also strengthened my ability to drive digital adoption. Beyond training, I ventured into developing custom software solutions for key departments of the district, tailoring automation to their needs. Among my most memorable assignments was managing election operations, a high-stakes responsibility that required meticulous planning—organizing training, deploying resources at counting halls, selecting personnel for round-wise data entry, and overseeing results compilation—all executed across in two locations 85 kilometres apart. Additionally, I played a key role in linking District court of Panchmahals via dial-up connectivity and developing an automated system for fair price shop allocation, which had a breakthrough that significantly improved efficiency in the Civil Supplies department. As these digital transformations took shape, the impact became evident—one success led to another, and soon, more departments began recognizing the power of technology, marking the dawn of a new era in governance.

In an era before **laser printers**, when the hum of **dot matrix printers** filled offices and perforated sheets lined every document, technology was a far cry from today's seamless digital world. The absence of **Google, Gmail, or graphical interfaces** meant that every

Beyond the screen: My NIC Journey

operation relied on a **text-based command-line environment**, demanding a deep familiarity with intricate commands. To navigate this, we used **Lyrix for word processing, FoxBase for databases, and the VI editor for programming**, mastering the nuances of each tool. Recognizing the need for structured guidance, I prepared **charts of frequently used commands**, ensuring that every department had a clear roadmap to log in and execute their tasks efficiently. One of the most exhilarating breakthroughs was the **successful integration of Hindi using Inscript terminals**, marking a significant step in making technology accessible to regional administrators. Steadily, **Panchmahals** evolved into a district where **IT was no longer an experiment but an integral part of governance**, embraced across multiple departments. Encouraged by this transformation, the **Collector championed further digital expansion**, recommending additional terminals and a **spacious hall** to accommodate the growing reliance on technology, solidifying the district's role as a pioneer in administrative digitalization.

Reflecting on my journey, I came to understand that the successful integration of Information Technology at the grassroots level relies on two critical elements: a visionary Collector who advocates for digital transformation and a dynamic District Informatics Officer (DIO) who serves as the bridge between technology and governance. The Collector plays a pivotal role in fostering a tech-driven work culture, while the DIO must go beyond mere technical expertise—engaging with departments, understanding their unique challenges, and crafting tailored database solutions that streamline operations and enhance efficiency. My time in Godhra was a defining period, shaping both my professional experience and personal growth. It not only gave me the confidence to design and implement IT solutions but also instilled in me the patience and strategic approach needed to gain the trust of officials—guiding them past their initial hesitations and encouraging them to embrace computers with confidence. I realized that the true success of digital transformation lies not just in building systems but in ensuring that those who use them feel empowered, comfortable, and equipped to harness technology effectively. This experience reaffirmed my belief that when introduced with clarity, purpose, and unwavering support, technology can seamlessly embed itself into governance, revolutionizing administrative efficiency and paving the way for a digitally empowered future.

Beyond the screen: My NIC Journey



DIO, Panchmahals District



At Gujarat State Unit



Fun time in Sector 7/2

Part 2: Managing IT in Government

Early Roles in IT and Governance

My career in **e-governance and IT-driven public service** began with a strong foundation in **software development, system analysis, and information management**. As a **Scientific Officer/Engineer-SB (Programmer/District Informatics Officer)**, my primary responsibilities revolved around **developing software tools and packages for various projects**, particularly in **Management Information Systems (MIS), relational database management systems (RDBMS), and networks**. I started working with user departments, designing **custom application solutions** and visit departments to ensure their effective implementation.

Stepping into the role of **Scientist-B (Systems Analyst)**, I gained **hands-on experience in planning, designing, and implementing IT initiatives** for government departments. My role encompassed **the development and implementation of information systems, and IT training programs for smooth operations**. Department visits continued to be a critical aspect of ensuring the practical success of these initiatives.

I also got the opportunity in working for Factory testing of newly supplied systems from various companies situated in Puducherry. Wipro, HCL, Acer, Numeric are some of the companies.

Expanding Responsibilities as System Analyst

With my promotion to **Scientist-C (Senior Systems Analyst)**, I got more complex assignments in system analysis, software development, and IT service delivery. This phase of my career allowed me to work extensively on computerization initiatives across multiple government sectors, including Civil Supplies, Budget Computerization, Elections and

Beyond the screen: My NIC Journey

Welfare program. My work involved optimizing processes, designing IT systems, and developing decision-support tools to improve administrative efficiency. I was also assisting the Election team in preparing few reports on Poll duties.

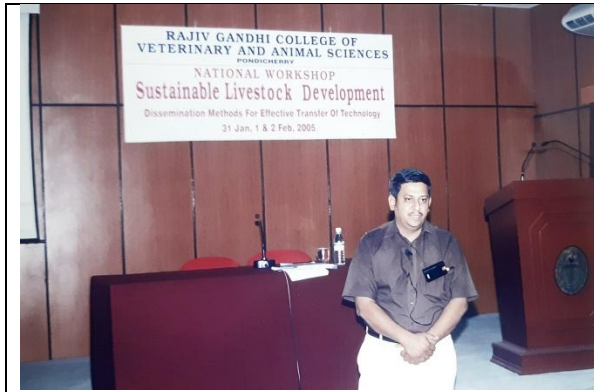
A significant milestone during this period was my work on graphical interfaces and dynamic data visualization. I successfully tested and implemented graphical user interfaces (GUIs) using dynamic charts in Visual Basic, enhancing the usability and accessibility of government applications. By integrating interactive visual elements, I made complex datasets more intuitive and user-friendly for officials who were not well-versed in traditional data analysis.

Recognizing the need for inclusivity in digital governance, I also worked extensively on integrating Indian language interfaces into multiple database applications. At a time when English-centric computing was dominant, I got the opportunity to work on government databases and software solutions supported regional languages, making them accessible to a wider audience. Some of the core codes I developed for language integration are available in the public domain, contributing to broader efforts in localization and digital inclusivity.

Additionally, I quickly mastered several web tools and technologies to expedite the development of nearly 23 government websites across various departments. These websites played a crucial role in making public services more transparent and accessible to citizens. Recognizing my proficiency in web technologies, I was entrusted with the additional responsibility of overseeing web design for government websites. This role required me to not only ensure aesthetic and functional design but also to implement security protocols, accessibility standards, and seamless user experiences. The websites of Govt. of Puducherry, Police, Vigilance, Civil Supplies, and Election were initially designed and hosted by me.

My ability to adapt rapidly to evolving technologies, develop multilingual applications, and enhance user engagement through graphical interfaces positioned me as web coordinator of NIC. At this juncture, I thank all my seniors and team mates who helped me in learning new things.

Beyond the screen: My NIC Journey



SAHAS – GIS system for Livestock



Launch of Vigilance website



With Sh.Vittal, IAS, Architect of Telecom Policy



With Sh. Veerasami, Chief Engineer, PWD.

As a **Scientist-D (Principal Systems Analyst)**, I transitioned into an independent **leadership role**, where I was responsible for the **planning, design, and implementation of IT systems in Govt. departments**. This role required a **deeper involvement in field research, technical evaluation, and stakeholder engagement**, ensuring that IT solutions met real-world governance challenges effectively. I also played a key role in **training government officials**, empowering them with the necessary technical skills to leverage these systems effectively.

One of the most significant projects, during this period, was the modernization of the Budget system, a transformation that had far-reaching implications for financial governance. The legacy FoxBase-based textual system was increasingly inadequate for handling the complexities of budget management, prompting the need for a graphical, user-friendly, and data-driven approach. The entire Budget Information System was migrated to a Visual Basic (VB)-based GUI environment, making budget planning and monitoring more efficient and accessible.

Beyond the screen: My NIC Journey

For the first time, instead of printing bulky budget books, we developed digital budget CDs, which were distributed to all departments. This initiative significantly reduced paper usage, improved accessibility, and streamlined budget analysis. Additionally, Budget Demands for Grants was published on the government website, ensuring greater transparency and public accessibility.

Recognizing the importance of financial data integration, I successfully linked the Budget system with Treasury operations. This integration enabled real-time expenditure tracking and budget allocation monitoring, allowing departments to view financial data from a new dimension—by scheme-wise allocation. The introduction of Planning Department Scheme Codes allowed for a structured and systematic representation of budgeted expenditures, helping decision-makers track fund utilization with greater accuracy.

Beyond financial modernization, I also played a pivotal role in revamping the Civil Supplies Department's IT framework. I introduced a Management Information System (MIS) that enhanced the monitoring, planning, and execution of food and essential commodity distribution. A key milestone in this modernization was the deployment of a LAN-based system, which successfully interlinked all sections within the Civil Supplies office. This internal connectivity streamlined workflows, improved data sharing, and enhanced coordination between various divisions, leading to greater operational efficiency and faster decision-making.

My tenure as Scientist-D was marked by the successful execution of mission-critical projects that reshaped Budget system of Finance department, improved public service delivery in Civil supplies, and strengthened government IT infrastructure. The innovations introduced during this period laid the foundation for more transparent, data-driven, and efficient e-governance systems that would continue to evolve in the years to come.

Driving Digital Transformation in Election Management

As part of my growing responsibilities, I was entrusted with the **overall coordination of IT activities for the successful conduct of elections**, ensuring a **seamless, transparent, and technology-driven electoral process**. This was a critical assignment that required extensive **planning, execution, and real-time monitoring**.

Beyond the screen: My NIC Journey



During a high-level meeting at the **Election Commission of India (ECI)**, I was given a crucial responsibility—to **standardize the format required for capturing poll details from polling booths across all constituencies**. This was a challenging yet rewarding task, as it laid the foundation for a **uniform data collection process that was adopted across the Union Territory (UT)**. This standardization enabled faster and more accurate reporting, ensuring that election officials had access to **timely and reliable data**.

One of the most **noteworthy milestones** during this period was the **design and implementation of a fully digitized polling booth system—an initiative that was introduced for the first time in the history of the UT**. This system revolutionized **polling booth operations**, making them **more efficient, transparent, and digitally connected**. Additionally, this role gave me the unique opportunity to work alongside **senior officials from other states**, of whom later went on to become **senior IAS officers**. The experience of collaborating with such distinguished officers provided **invaluable insights into large-scale governance and administrative decision-making**.

The CIPA Initiative

In another significant initiative, I was given an opportunity in modernizing police station operations through the implementation of CIPA (Common Integrated Police Application). This project aimed to digitize police station workflows, ensuring real-time data entry, case tracking, and improved law enforcement management.

For the first time, a Local Area Networks (LAN) in each police station, had been set up enabling seamless communication and data sharing across different departments. The CIPA system was successfully installed in all police stations, allowing officials to digitally manage daily General Diaries, First Information Reports (FIRs), investigation details, and prosecution records. This marked a major shift from traditional paper-based record-keeping to a centralized, structured, and easily accessible digital system.

Beyond the screen: My NIC Journey

Recognizing the importance of capacity building, a comprehensive training program for all police personnel **was conducted across the UT. I had an opportunity to** travel extensively to every police station, **ensuring that officers were well-equipped to** use the system efficiently. **These efforts not only helped in improving the** operational efficiency but also enhanced transparency and accountability in law enforcement.

One of the most ground breaking aspects of this initiative was my effort to integrate police station data with a centralized live server. **This enabled** daily updates of case records and the creation of an MIS (Management Information System), **allowing senior officers to** monitor key statistics such as the number of FIRs filed, details of accused persons, investigation status, and crime trends **in real time.**

Furthermore, I took the initiative to link police records with the Transport Department's vehicle database, **enabling law enforcement officers to** cross-check lost vehicle details instantly. **This integration greatly enhanced** crime detection capabilities, **allowing the police to** track and recover stolen vehicles more efficiently. I take this opportunity to thank Mr.P.Sridharan, Technical Director, of our office for all his support.



Additionally, a detailed case study was made on how CIPA data could be integrated with the Prisoner Database **and** Vehicle Database **creating a** more comprehensive and interconnected criminal justice system. **This study** demonstrated the potential for streamlining criminal records management, **ensuring that data across** police stations, courts, and prisons **could be synchronized for** better decision-making and law enforcement coordination. It was a matter of great pride that a tableau on the Common Integrated Police Application (CIPA) operating Police station was prominently displayed during the Republic

Beyond the screen: My NIC Journey

Day parade in Puducherry. The states like HP, MP shown keen interest on the CIPA model of Puducherry.

Leading Large-Scale E-Governance Projects

With my promotion to Scientist-E (Technical Director), I was given the responsibility of overseeing the management and execution of high-impact e-governance projects. **My expertise now spanned** project management, database management, system software design, and computer maintenance management. **During this time, I received significant recognition for my contributions to** election management, public distribution systems (PDS), employment exchange modernization, and police automation.

Beyond technology implementation, my role required strategic planning and coordination **to ensure that mission-mode projects were delivered in a** time-bound and effective manner. **I was also actively involved in** review meetings, technical advisory committees, and high-level discussions with government leadership.

Transforming Public Distribution through Smart Cards and Biometric Authentication

As Scientist ‘E’, I was presented with one of the most challenging and transformative opportunities **in my career**—the implementation of Smart Cards for the Public Distribution System (PDS). **This initiative aimed to** modernize the ration card system **by embedding** biometric details into smart cards, **which would then be verified at** Fair Price (FP) shops using Point-of-Sale (PoS) devices. **The vision behind this project was to** eliminate fraudulent transactions, ensure that subsidies reached the right beneficiaries, and introduce real-time tracking of PDS transactions.

Navigating the Complexities of Smart Card Implementation

The project involved multiple layers of technical and operational challenges, requiring a deep understanding of Smart Card technology, PoS device integration, and real-time data synchronization. **One of the initial tasks was to** float a Request for Proposal (RFP), **which involved defining** technical specifications for PoS devices, Smart Cards, and the secure transmission of transaction data **from** Fair Price Shops to a central server. **Each component had to be meticulously** evaluated, tested, and validated **to ensure that the system could operate at scale across the entire state.**

Beyond the screen: My NIC Journey

Setting Up a Seamless Data Exchange Mechanism

A critical aspect of the project was defining a **Standard Operating Procedure (SoP)** between the **NIC system and the System Integrator** responsible for conducting Aadhaar enrollment camps. The SoP outlined:

- **Procedures for camp setup, data capture, and secure storage** of Aadhaar biometric details.
- **Protocols for transferring enrollment data** from field locations to the central repository.
- **Integration mechanisms** between the **captured Aadhaar KYC data and the ration card database**.
- **Incorporation of additional PDS-specific KYC+ parameters** to enrich the beneficiary dataset.

This required **regular coordination with UIDAI (Unique Identification Authority of India) and NIC Headquarters**, as the **seamless exchange of biometric data was crucial for authentication at Fair Price Shops**. The **real-time verification process** was designed to ensure that beneficiaries could authenticate themselves at any FPS, **eliminating duplicate and ghost beneficiaries from the system**.

Overcoming Challenges and Establishing a Scalable Model

The **complexity of the data flow and integration** required continuous problem-solving, technical innovation, and stakeholder collaboration. Some of the key challenges we resolved included:

- Ensuring compatibility between Aadhaar biometric formats and Smart Card encryption standards.
- Developing a secure yet efficient mechanism for data synchronization between FP shops, the State Data Centre, and central PDS servers.
- Optimizing network infrastructure to enable real-time authentication without delays, even in remote locations.

Beyond the screen: My NIC Journey

Through **persistent efforts, structured teamwork, and iterative improvements**, we successfully **rolled out the Smart Card-based PDS authentication system**, making it one of the most **secure and efficient digital food distribution models in the country**.

A Model for Other States to Replicate

The success of this initiative **attracted national attention**, and our model was studied by **several states, including Delhi and Tamil Nadu**, which sought to replicate similar systems in their own PDS frameworks. **The structured integration of Aadhaar, Smart Cards, PoS devices, and real-time authentication became a benchmark for digital transformation in food subsidy distribution.**

These projects were not just a technological advancement but also a **testament to how IT-driven solutions could bring transparency, efficiency, and accountability to large-scale public welfare programs**. Looking back, this initiative **stands as one of the most impactful implementations**, demonstrating how **strategic planning, technological expertise, and cross-departmental collaboration** can drive **governance reforms at an unprecedented scale**.

The projects viz., Search Electors in Regional Languages, Trends Information System, Computer Aided Ration card Information System, Smart Card based PDS, CIPA integration have been replicated in Tamil Nadu, Goa, Andaman & Nicobar respectively. The Smart card based PDS and CIPA integration was studied as best practices by Tamil Nadu, Delhi, Uttarakhand and Himachal Pradesh. The DBT portal of PDS has been presented to Ministry of Food and Civil Supplies, Govt. of India, New Delhi.

Modernizing the Employment Exchange System – A Landmark Transformation

One of the most formidable challenges I encountered during my service was the **modernization of the Employment Exchange system**, which had been operating on an **outdated COBOL-based legacy system**. The project had already been attempted **three times in the past**, each time resulting in failure due to **technical, operational, or implementation challenges**. When the responsibility was entrusted to me as a **major assignment**, I saw it not just as a **task to be completed** but as an **opportunity to bring**

Beyond the screen: My NIC Journey

about a lasting impact. I wish to bring the excellent technical support of my colleague shri. M.P. Anandkumar, Technical Director who is now working in NIC, Gujarat.

Overcoming Legacy System Limitations

The first and most significant hurdle was **data migration**. The COBOL system stored information in **unstructured textual formats**, making direct porting **infeasible**. To address this, I employed **advanced data extraction and parsing techniques** to meticulously **convert the raw, text-based legacy data into a structured dataset**. Each record was carefully **formatted, validated, and assigned proper specifications** to ensure **data integrity** during the transition.

The next phase involved the **ETL (Extraction, Transformation, and Loading) process**, where the cleansed and structured data was **migrated to a modern, web-enabled system** powered by a **PostgreSQL database**. This transition not only **preserved the accuracy of employment records** but also **enhanced accessibility, efficiency, and scalability**, bringing the entire system into the digital age.

Building a Seamless and User-Friendly System

With the **back-end database successfully migrated**, the focus shifted to **revamping the user experience**. The new system introduced **online registration, renewal, and job submission processes**, eliminating the cumbersome manual procedures that had persisted for decades.

To further simplify employment registration, **dedicated enrolment camps were organized for school students**, ensuring **early engagement with the employment system**. One of the most innovative enhancements was the **introduction of barcodes for registration records**, which not only **streamlined data entry** but also **significantly reduced errors**, ensuring that applicants' details were captured **quickly and accurately**.

Recognition and Lasting Impact

This project remains **one of the most personally fulfilling initiatives of my career**. The transformation of the **Employment Exchange System** from a **rigid, outdated, and failure-**

Beyond the screen: My NIC Journey

prone legacy system to a dynamic, web-enabled platform was not just a technical upgrade but a **strategic overhaul of how employment services were delivered to citizens**.

The success of the project was **widely appreciated by the Government**, and the new system became a **model for digital employment services**. The **speed and efficiency** with which the transition was executed—completing a **full migration in record time**—demonstrated the **power of determination, technical expertise, and innovative problem-solving**.

This experience reinforced my belief that **no system is too outdated to be modernized** and that with the **right strategy, perseverance, and team work**, even the most challenging technological transformations can be achieved.

Publishing papers, Webinars, and Copy rights

I had opportunity on submitting and publishing papers. The following are the important ones which I would like to mention.

- **DBT IMPLEMENTATION FOR PDS PUDUCHERRY UT : TECHNOLOGICAL CONVERGENCE, ISSUES AND ITS IMPLEMENTATION - A CASE STUDY -**

Publication Date : 15/08/2017, Type : Research Papers, URL : [https://www.worldwidejournals.com/indian-journal-of-applied-research-\(IJAR\)/article/dbt-implementation-for-pds-puducherry-ut-technological-convergence-issues-and-its-implementation-a-case-study/MTI2OTQ=/?is=1](https://www.worldwidejournals.com/indian-journal-of-applied-research-(IJAR)/article/dbt-implementation-for-pds-puducherry-ut-technological-convergence-issues-and-its-implementation-a-case-study/MTI2OTQ=/?is=1)

Stream : ICT Project Management, Journal : Indian Journal of Applied Research IJAR, ISBN : 2249-555X
Publisher : Indian Journal of Applied Research IJAR

- **TECHNOLOGY ASSISTED MOBILE APPLICATIONS FOR ONLINE EDUCATION - DIGITAL TWINS FOR VISUAL REPRESENTATION OF PHYSICAL OBJECTS**

DOI No. : 10.36106/ijar, First Author(s) : Shri V.Gopi Swaminathan (3818), Publication Date : 01/12/2022
Type : Journals URL : [https://www.worldwidejournals.com/indian-journal-of-applied-research-\(IJAR\)/fileview/technology-assisted-mobile-applications-for-online-education-digital-twins-for-visual-representation-of-physical-objects_December_2022_4736719905_0115893.pdf](https://www.worldwidejournals.com/indian-journal-of-applied-research-(IJAR)/fileview/technology-assisted-mobile-applications-for-online-education-digital-twins-for-visual-representation-of-physical-objects_December_2022_4736719905_0115893.pdf)

Stream : ICT Project Management, Journal : Indian Journal of Applied Research IJAR, ISBN : 2249-555X
Publisher : Volume : 12 Issue : 12 Uploaded file:View

- **NATIONAL CONFERENCE ON APPROPRIATE TECHNOLOGIES FOR (NCAT) RURAL INDIA 2022**

Duration : 06/12/2022 - 06/12/2022, Stream : ICT Project Management, Hosted By : Centre for Appropriate Technology Management (CIMP) in association with NABARD, Hosted At : Hybrid Mode - Online

Beyond the screen: My NIC Journey

Webinars

- Data warehouse concepts and components
- Cyber security – Landscapes
- Blockchain concepts
- Direct benefit transfer



IPR copy rights for e-governance projects

S.No.	Software Application Title
1.	Citizen Services for Election
2.	Real Time Poll Monitoring System (RTPMS)
3.	SMS Portal
4.	Trends Information System
5.	Android App for Citizen for General Information to Voters
6.	Puducherry PDS DBT Portal
7.	Smartcard Based PDS
8.	Employment Exchange
9.	SAFe
10.	Unified Data Hub (UDH)

3. Part 3 At the Helm of E-Governance: Leadership as SIO

New Era of Leadership – My Journey as Additional State Informatics Officer (ASIO) and State Informatics Officer (SIO)

In 2023, I was entrusted with the role of Additional State Informatics Officer (ASIO), marking a significant milestone in my career. This assignment provided me with **administrative and strategic responsibilities**, allowing me to **influence decision-making at the highest levels** while ensuring the smooth functioning of NIC operations in the state. It was a role that required a **fine balance between technical oversight, operational efficiency, and organizational leadership**—a challenge I accepted with great respects wholeheartedly.

Strengthening Administrative and Operational Efficiency

One of my **early initiatives** as ASIO was to **streamline the procurement process** for IT and office-related infrastructure. I took a **special interest in the acquisition of essential items for our stores**, ensuring that **procurements were need-based, cost-effective, and aligned with the long-term objectives of the organization**. Simultaneously, as part of the **Swachh Bharat Mission**, I spearheaded the **disposal of obsolete items**, clearing years of accumulated e-waste and outdated equipment. This effort not only **optimized storage space** but also **reinforced environmental responsibility within the organization**.

Beyond procurement, I introduced a **structured review mechanism for all ongoing projects**, conducting **regular evaluations and making critical observations** to ensure projects stayed **on track, aligned with government priorities, and met the highest standards of execution**. This **proactive approach** allowed me to **identify bottlenecks early**, propose **course corrections**, and **accelerate project delivery timelines**.

Representing NIC at High-Level Decision-Making Forums

My role as ASIO also involved **representing NIC in high-stakes decision-making meetings**, including **Steering Committees, Apex Committees, and other strategic forums** where major e-Governance policies and programs were shaped. This exposure allowed me to

Beyond the screen: My NIC Journey

advocate for technology-driven governance, highlight the challenges faced by departments, and propose solutions to improve digital service delivery.

Through **active participation in these forums**, I gained **invaluable insights into policy formulation, inter-departmental coordination, and the evolving expectations from NIC as the primary technology partner for the government**. This experience strengthened my ability to **align technology initiatives with governance priorities**—a skill that proved instrumental when I later took over as **State Informatics Officer (SIO)**.

Fostering a Positive Work Environment and Financial Discipline

Leadership is not just about **projects and policies**—it is equally about **people**. I strongly believed that **a motivated team is the backbone of any successful organization**. To **uplift office morale and maintain a positive work culture**, frequent interactions with **individuals and teams were done**, fostering an environment of **collaboration, transparency, and mutual respect**. By ensuring that **everyone's contributions were acknowledged and valued**, we were able to **build stronger engagement and drive better results**.

Additionally, I took a **meticulous approach to procurements and servicing**, ensuring that **each bill was thoroughly analyzed and processed in a timely manner**. This **diligence in financial oversight** eliminated delays in **vendor payments, service procurements, and project expenditures**, thereby **enhancing operational efficiency and strengthening trust in the system**.

I took special attention in introducing the Quality management for the major systems and accordingly, we got Quality certification for Recruitment Portal and Ease of Doing business Portals.

Stepping into the Role of State Informatics Officer (SIO)

When I later assumed the role of **State Informatics Officer (SIO)**, these experiences as ASIO proved to be **invaluable**. The **comprehensive understanding I had gained—ranging from procurement and project reviews to high-level decision-making and administrative leadership**—helped me transition seamlessly into this higher responsibility.

Beyond the screen: My NIC Journey

As SIO, I now had the **ultimate responsibility of driving NIC's technology initiatives across the state**, ensuring that **e-Governance projects remained innovative, citizen-centric, and impactful**. My journey from ASIO to SIO was not just about **career progression**—it was about **transforming the way technology was leveraged for governance and ensuring that NIC remained at the forefront of digital transformation in the state**.

This phase gave an opportunity for the **commitment to operational excellence, strategic foresight, and people-centric leadership**. Reaching the pinnacle of my career as the **State Informatics Officer (SIO)**, I was entrusted with the **formulation, development, and implementation of specialized software projects for state-wide e-governance**. This included major public service programs such as **driving licenses, vehicle registrations, ration cards, Marriage certificates and land records**. I ensured **NIC network expansion across all districts**, enabling efficient data exchange and IT service delivery.

My responsibilities extended to **continuous coordination in system studies, stakeholder collaboration, and the design and implementation of Management Information Systems (MIS) in sectors such as civil supplies, elections, welfare schemes, e-file management, grievance redressal, and law enforcement**. I also led the **development of specialized training modules for government departments**, equipping officials with the knowledge and skills required to manage and utilize e-governance platforms effectively.

Seamless Migration to National Cloud

One of the most **complex and high-priority assignments** was the **migration of all state government websites and web applications from the State Data Centre to the National Cloud**. This **massive digital transition** required a meticulous, multi-stage process, including:

- **Allocation of Virtual Machines (VMs)** and ensuring optimal resource planning
- **Comprehensive hardware and application audits** to assess infrastructure readiness
- **Installation of essential software modules** and fine-tuning configurations for seamless hosting
- **Rigorous testing and security compliance** before final deployment

With the **collective efforts of a dedicated team of NIC Puducherry officers, in collaboration with NIC Delhi**, we successfully **migrated nearly 50 websites and 40 web applications in a record five months**. This transition not only **enhanced scalability and**

Beyond the screen: My NIC Journey

resilience but also aligned Puducherry with the national vision of **centralized and secure digital infrastructure**.

Strengthening Cybersecurity and Data Protection

Ensuring **robust cybersecurity** for government IT assets was a **continuous responsibility**. My tenure saw **proactive monitoring, compliance enforcement, and timely mitigation strategies** in response to cybersecurity advisories from:

- **Ministry of Home Affairs (MHA)**
- **Ministry of Electronics and Information Technology (MeitY)**
- **NIC-CERT and Centre for Application Security**

To further strengthen **data security and disaster recovery**, I spearheaded the **formulation of a Data Backup, Retention, and Archival Policy** for critical databases, including **Public Distribution System (PDS) and Electricity Billing**. This policy was designed to **protect sensitive citizen data, ensure business continuity, and adhere to national data governance standards**.



PWD water bill system inauguration



Safer Internet Day



Participation in Cyber security SZ conference



Release of “Cyber security guidelines and Mitigation plan for Govt. Departments “ by Chief Secretary to Govt. of Puducherry

Beyond the screen: My NIC Journey

Recognizing the NIC's efforts in **cybersecurity strategies and risk mitigation**, I was invited to **speak at the South Zone Cybersecurity Conference**, where I presented Puducherry's initiatives in **securing digital assets, enforcing compliance, and mitigating potential cyber threats**. The presentation was **well received by senior officials, including the Special Secretary of MHA**. Additionally, I played a key role in **drafting a comprehensive Cybersecurity Mitigation Plan**, which was later vetted by **NIC's Cybersecurity Division in Delhi**.

Institutionalizing Governance, Accountability, and Project Excellence

To **streamline office operations, improve project oversight, and enhance accountability**, I introduced **structured monthly review meetings**, where project progress, challenges, and upcoming priorities were **systematically reviewed**. **Heads of Divisions (HoDs) were appointed** and entrusted with **specific responsibilities**, ensuring that all **project commitments were met on time with high-quality outcomes**.

During this period, NIC Puducherry successfully implemented several **high-impact e-Governance initiatives**, including:

Water Billing System – A streamlined digital platform for water usage monitoring and billing

Schools Renewal System – Automation of school renewal processes, ensuring efficiency

Revamped MIS Portal for Welfare Schemes – Providing real-time analytics for policymakers

Field-Level Meter Reader Applications – Enabling on-site data collection for electricity and water services

Recruitment Portal for Government Examinations – Facilitating transparent and smooth conduct of state-level recruitments

CS Dashboard - A dashboard has been designed for Chief Secretary to review the priority areas, infrastructure projects, Court cases, and Vigilance cases.

Beyond the screen: My NIC Journey

LG dashboard – A comprehensive portal for Hon’ble LG has been entrusted to NIC. The best practices implemented at CMO, Gujarat was studied.

Additionally, operational efficiency was enhanced through **strategic procurements**, including **printers, UPS systems, and batteries**, and **infrastructure restructuring** to create **better workspace accommodations**. A major cleanup drive was undertaken at **both state and district levels to dispose of obsolete and scrap items**, aligning with the **Swachh Bharat Mission**.

Representing Puducherry at National Platforms

My role as **SIO provided opportunities to represent NIC Puducherry in prestigious national forums**. I actively participated in various **State and Apex Committees**, contributing to **policy discussions and strategic decision-making for IT-enabled governance**. A significant highlight was **attending the IT Secretaries’ Conference in Delhi**, where I **presented Puducherry’s digital transformation journey and engaged in high-level deliberations on emerging technology trends**. Also, I represented the UT in the Cyber security SZ conference held in Puducherry and gave a talk on the existing status as well as future requirements.

Fostering a Culture of Learning and Professional Growth

One of my greatest satisfactions as SIO was **mentoring and empowering my team**. I took **personal interest in nominating NIC Puducherry officers for specialized training programs**, ensuring they stayed updated with **cutting-edge technologies and best practices**. Additionally, **knowledge-sharing within the office**, organizing **technical talks where officers presented emerging concepts and innovations are given enough importance**.

Seeing **several officers earn well-deserved promotions** during my tenure was particularly gratifying, as it reinforced the **impact of professional development and career progression within NIC**.

Serving as the **nodal officer for NIC in high-level Secretary/HoD meetings**, I provided **technical advisory services, organized reviews, and ensured policy alignment with national e-governance frameworks**.

Beyond the screen: My NIC Journey

A one day workshop was organized during April'2025. DG, NIC and DDGs of NIC, Delhi gave presentations on various topics that include Open Data, Data Harmonization, Secure intranet, Gov.drive, Cyber security and DPDP act. The Chief Secretary and Secy(IT) addressed and appreciated the NIC, Puducherry for its activities. DG, NIC gave a key note address. The DG, NIC also met Hon'ble LG and Hon'ble CM, Hon'ble Min. of IT during his visit. A book was released on **"IT initiatives and services of NIC for Puducherry"** during the event. A video on NIC, Puducherry and its achievements was also released.



Major responsibilities given by Apex administration

- Nodal Officer for IT for Elections
- Member-convenor of Technical Steering committee for Unified Data Hub
- Member of DBT Cell, Govt. of Puducherry
- Member of CIPA implementation committee
- Chairman, NeVA implementation committee
- Member, Digital India Program, Puducherry

National level Recognition

I had the **privilege of contributing** to two landmark national initiatives that have had a profound impact on governance and public service delivery. I was honored to be a part of the **Point-of-Sale (PoS) Device Specification Committee** for the **Public Distribution System (PDS)**, where we worked on defining the technical and functional specifications for PoS devices to ensure **transparency, efficiency, and accountability** in the distribution of essential commodities. These devices played a **crucial role in eliminating fraudulent transactions, improving inventory management, and enabling Aadhaar-based biometric authentication** in Smart card based PDS to ensure that benefits reached the intended beneficiaries without pilferage. The Project received eINDIA award for the year 2014.

Additionally, I was fortunate to serve as **one of the key members** in standardizing the **Poll Monitoring System** for the **Election Commission of India (ECI)** at the national level. The

Beyond the screen: My NIC Journey

project aimed to **enhance the integrity, accuracy, and efficiency of the electoral process** by establishing robust **monitoring and reporting mechanisms**. Our efforts contributed to creating a **standardized digital framework** for real-time poll monitoring, ensuring **secure data transmission, effective tracking of polling activities, and swift response to any anomalies during elections**. The Trends Information System, Udhavi and Theervu collectively assured a reliable system for the complete gamut of activities in Elections. These initiatives not only leveraged technology to **improve governance** but also reinforced **transparency and efficiency** in two of the most vital processes—**food security and electoral integrity**. The ICT activities for Elections won a National Award from Election Commission of India for IT. I also got a major opportunity to prepare the compendiums of all major IT activities done by all states and submitted it to ECI. Also, a separate book was prepared on the IT activities for Elections and presented to ECI during ECI South Zone Conference.



Received Award of excellence from Hon'ble President of India– ECI awards 2017



Received eINDIA award for Smart Card based PDS in 2014.

4. Learnings

The Impact of Policies on IT Operations

Policies play a **critical role** in shaping the direction, execution, and sustainability of IT operations within government organizations. They provide the necessary **framework, structure, and governance** to ensure smooth project implementation, compliance, and long-term efficiency. From forming teams to securing financial approvals, every aspect of IT operations is influenced by well-defined policies.

Beyond the screen: My NIC Journey

1. Forming Teams – The Right Mix of Expertise and Roles

One of the fundamental aspects of IT operations is the **formation of competent teams**. Policies determine:

- The **structure and composition** of teams, ensuring the right mix of **technical, managerial, and operational** personnel.
- The **approval process** for team allocation, defining responsibilities and accountability at each level.
- Guidelines for **inter-departmental collaboration**, particularly in cross-functional projects requiring coordination with multiple government agencies.

Without clear policies, team formation can become **ad hoc**, leading to inefficiencies, lack of accountability, and misalignment with project goals. A well-structured policy ensures that **each team is adequately staffed, roles are clearly defined, and necessary approvals are obtained without bureaucratic delays**.

2. Evolution of Policies and Standard Operating Procedures (SoPs)

Policies drive the **evolution of SoPs**, which serve as a **blueprint for IT operations**. The effectiveness of any IT system depends on how well its processes are **standardized, documented, and enforced**. Key areas where SoPs play a crucial role include:

- **Project Management** – Defining step-by-step guidelines for initiation, development, deployment, and monitoring.
- **Security and Compliance** – Establishing measures for **data protection, access control, and cybersecurity best practices**.
- **Incident Handling and Disaster Recovery** – Ensuring preparedness for **system failures, cyberattacks, or data breaches**.

A well-evolved **SoP framework reduces ambiguity, streamlines workflows, and ensures consistency across IT projects**.

3. Hiring Manpower – Addressing Skill Gaps and Resource Availability

A significant challenge in any project is **manpower availability and retention**. Policies define:

- **Hiring procedures** – Whether contractual, permanent, or outsourced staffing models should be adopted.
- **Skill-based requirements** – Ensuring that the workforce possesses the necessary expertise in emerging technologies.
- **Approval hierarchy** – The process for requesting additional manpower and justifying its necessity.

Beyond the screen: My NIC Journey

Without proper policies, IT projects **struggle with delays in recruitment, skill mismatches, and resource shortages**, affecting project timelines and efficiency. Clear **manpower hiring policies** ensure that the development and implementation teams remain adequately staffed with skilled professionals to handle critical operations.

4. Financial Approval for Project Extension – Ensuring Long-Term Viability

Many IT projects require **continuous funding for upgrades, maintenance, and scalability**. Policies play a pivotal role in:

- Defining **budgeting norms** and **financial justifications** for project extensions.
- Establishing a process for **securing approvals from finance departments**.

A lack of policy clarity often leads to **funding delays, project discontinuation, or suboptimal implementations due to budget constraints**. Well-defined policies ensure that **critical IT projects receive the necessary financial backing for long-term sustainability**.

5. Approval for Data Formats and Standardization – Enabling Interoperability

One of the most overlooked yet vital policy areas in IT operations is data standardization. Policies dictate:

- The **standardized formats for data collection, storage, and exchange** across government departments.
- **Interoperability guidelines**, ensuring seamless data sharing between different applications and agencies.
- Compliance with **national data standards** for structured reporting and analytics.

Without such policies, IT projects face inconsistencies, data silos, and inefficiencies in data utilization. **Standardization policies enable** better decision-making, smoother integrations, and enhanced service delivery.

Part 5: Conclusion: Reflections on 31 Years in Government IT

As I look back on my **31-year journey** in government IT, I see a landscape of continuous evolution, challenges, and triumphs. From the early days of **mainframe-based computing** to today's **AI-driven governance**, the role of IT in the Government departments has transformed drastically. This conclusive chapter brings together my experiences in **managing teams, handling crises, key lessons learned, and a forward-looking perspective on the future of IT in government**.

1. Managing Teams & Talent Retention

One of the most significant challenges in government IT is **building and retaining skilled professionals**. Unlike the private sector, where talent moves dynamically, **Govt. departments IT teams requires long-term commitment and domain expertise**. NIC has **remained a trustworthy technical partner** for major **Central and State government projects** as well as in districts, playing a crucial role in e-Governance transformation.

Managing IT teams in this space involves:

- **Creating an environment of continuous learning**, as technology evolves rapidly.
- **Empowering teams with ownership** of projects, ensuring motivation and accountability.
- **Navigating bureaucratic hurdles** to secure the necessary approvals and funding for projects.
- **Ensuring talent retention** by providing exposure to national-level projects and encouraging innovation.

One key realization from my years of leadership is that **people, not just technology, drive success**. A motivated and well-supported team can overcome **budget constraints, policy challenges, and technical difficulties** to deliver meaningful impact.

2. Crisis Management & Disaster Recovery

IT failures in government systems can have **far-reaching consequences**, affecting public services, governance, and citizen trust. Over the years, the IT infrastructure need to have necessary crisis management and disaster recovery measures on **major cyber security threats, data loss incidents, and application failures**, each demanding **swift response and structured recovery plans**.

Crisis management in IT involves:

- **Preemptive cybersecurity measures** – Regular patching, security audits, and monitoring of government IT infrastructure.
- **Disaster recovery planning** – Maintaining **redundant backups**, cloud-based failover solutions, and real-time data replication.

Beyond the screen: My NIC Journey

- **Rapid response teams** – Ensuring that trained personnel can quickly address **cyberattacks, system crashes, and data breaches.**
- **Transparency and accountability** – Keeping stakeholders informed and implementing **corrective actions to prevent recurrence.**

I recall an incident where a **major government database was compromised**, causing significant disruptions. The quick **deployment of cybersecurity experts, isolation of affected systems,** and **collaborative mitigation efforts** ensured a swift recovery with minimal data loss.

3. Key Lessons from 31 Years – Personal Takeaways and Advice

Reflecting on three decades in government IT, some key lessons stand out:

1. **Time Management is Critical** – Government projects have strict deadlines, and **delays can impact governance at large.** Managing **timelines effectively** ensures that citizens receive timely benefits.
2. **Comprehensive Documentation** – Every IT project must have well-defined:
 - **Project Proposals – A well defined PRISM template is available.**
 - **Software Requirement Specifications (SRS)**
 - **Milestone-based Progress Reports**
 - **User Acceptance Testing (UAT) Protocols**
 - **Completion and Handover Documentation**
3. **Hiring and Resource Management** – Skilled manpower is the backbone of any IT initiative. **Efficient hiring, upskilling, and retention** are necessary for project continuity. A PMU is required to handle the design & development as well as Operation and maintenance support.
4. **Policy & SoP Compliance** – Clearly defined **Standard Operating Procedures (SoPs)** ensure that:
 - **Access controls are secure.**
 - **Data handling follows prescribed guidelines.**
 - **Government IT laws and regulations are followed.**
5. **Understanding Acts and Notifications** – Government IT projects are **deeply tied to legal frameworks.** Understanding policies related to **data privacy, IT procurement, and security** helps in making **informed decisions.**

These principles have guided me in executing complex projects and ensuring their long-term sustainability.

4. Future of IT in Government – Where Things Are Headed

Technology is evolving at an **unprecedented pace**, and **government IT must adapt accordingly.** Looking ahead, I foresee:

Beyond the screen: My NIC Journey

- **AI and Data Analytics in Governance** – Predictive analytics, AI-driven decision-making, and **big data analysis** will revolutionize government services.
- **Blockchain for Transparency** – **Immutable ledgers** will enhance security in public transactions, land records, and supply chain management.
- **Cloud-First Approach** – With government IT moving towards **cloud-based infrastructure**, more applications will be **migrated to national and hybrid cloud environments**.
- **Cybersecurity as a Priority** – **Governments will focus on stronger cyber policies**, real-time threat detection, and **mandatory vulnerability assessments**.
- **SWOT Analysis of IT in Government:**
 - **Strengths** – Digital governance, increasing IT adoption, NIC or a Govt. Department to work as a reliable partner.
 - **Weaknesses** – Delays of Project approval, budget constraints, talent retention.
 - **Opportunities** – Emerging technologies, automation, smart governance.
 - **Threats** – Cyber threats, legacy systems, data privacy challenges.

Organizations like **NIC will continue to play a key role** in enabling government IT transformations, ensuring **secure, scalable, and citizen-centric digital governance**.

Final Thoughts

As I conclude this book, I look back with gratitude on a journey of over 31 years in government IT — a journey defined by learning, apply, and implement. From driving e-Governance initiatives to overcoming cybersecurity challenges, each experience has strengthened my conviction that technology, when applied with purpose, can profoundly transform governance and improve lives.

This book is a humble attempt to share insights that I wish to submit to future IT professionals and policymakers in advancing digital governance.

I owe my deepest gratitude to the many hands and minds that shaped this path — family members who stood by me, seniors who mentored, colleagues who collaborated, developers who innovated, officers and staff of Government departments who stood together through every challenge. Without their unwavering support, this journey would not have been as fulfilling.